

Overview



Paleolithic era stone tools

In this unit, students explore the essential characteristics of scavenger/hunter-gatherer societies, including the development of tools and the use of fire. The lessons delve into the interactions between the scavenger/hunter-gatherer societies and natural systems. The Paleolithic (Stone Age) people used tools made from natural materials they found in the ecosystems in which they lived. They used these tools to extract, **harvest**, transport, and consume **ecosystem goods** and to take advantage

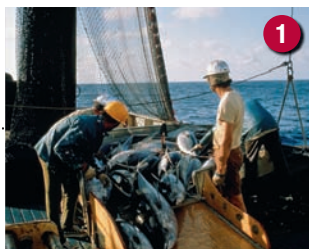
of **ecosystem services**. Paleolithic people learned to use these resources to meet their survival needs.

Students begin their study of scavenger/hunter-gatherer societies by reading *California Connections: Fishing for Tuna*, a piece that sets the stage for students to explore ways in which humans, dating back to our earliest ancestors, have used and influenced the environment. By tracing the history of tuna fishing in the San Diego area, students see how increased use of tools and technology

changes people's degree of influence on their surroundings.

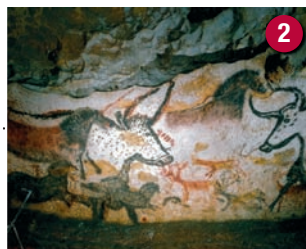
In the next three lessons of the unit, students examine scavenger/hunter-gatherer societies, their tools and techniques, and their reliance upon goods and services obtained from natural systems. In the early **Paleolithic period**, the small populations of nomadic scavenger/hunter-gatherers had few tools. They took only what they needed to survive; their extraction of resources was at the subsistence

At a Glance



Focus on Fishing

Explore the effects of the tuna industry as an example of how people influence their environment.



Paleolithic Populations Needed Natural Services

Compare how the scavenger/hunter-gatherers used tools to meet their survival needs.



Investigating Implements

Examine how tools helped Paleolithic people extract, harvest, transport, and consume goods.



California Content Standard

- 6.1.** Students describe what is known through archaeological studies of the early physical and cultural development of humankind from the Paleolithic era to the agricultural revolution.
- 6.1.1** Describe the hunter-gatherer societies, including the development of tools and the use of fire.

level. By the late Paleolithic period, scavenger/hunter-gatherer communities had expanded in range and population first throughout Africa, Asia, Indonesia, Europe, and Australia, and eventually the Americas. Their ingenuity enabled them to adapt to their surroundings, finding alternative uses for tools and discovering how to use the climate and ecosystem goods to their advantage. Tools and the use of fire enabled efficient extraction and harvesting of goods. In turn, these practices influenced the viability of natural systems and the distribution and diversity of resources.

In the fifth lesson, the students synthesize information they have learned from the unit and apply it to modern times to discover differences and similarities between Paleolithic and modern humans' reliance on

California Environmental Principle II

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies. As a basis for understanding this principle:

Concept B. Students need to know that methods used to extract, harvest, transport, and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept C. Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems.

ecosystem goods and services to assure their survival.

The end of the Paleolithic period coincides with significant wildlife extinctions on several continents. Whether or not human activity caused these extinctions is in dispute; however, a correlation may exist. In the final lesson of the unit, students explore several hypotheses to explain the cause of the mass extinctions, and

they compare the extinctions to the decline in tuna populations discussed in Lesson 1.

The unit brings to light the prehistory of humans and introduces the interaction between human culture and the natural environment. This unique perspective provides students with a broader understanding of where we have come from and where we may be headed.



Fabulous Fire

Discuss ways Paleolithic people may have used fire.



Tools: Today and Yesterday

Examine the tools and techniques modern humans use to meet their basic survival needs.



Mastodons and Modern Times

Compare the extinction of the mastodon at the end of the Pleistocene Ice Age to modern-day issues.

California Connections

Fishing for Tuna

Thousands of years ago, the San Dieguito Paleo-Indians lived along the shores of the San Diego Bay. Theirs was the earliest known culture in California. The Indians spent part of each year in the inland mountains and part along the coast. The San Dieguito fashioned crude points for hunting and fishing. Food was plentiful on land and in the shallow waters of the bay. In tide pools and lagoons, they collected abalone, mussels, scallops, and clams.



Explorer Juan Rodriguez Cabrillo led the first known European expedition to San Diego Bay.

In 1542, he sailed Spanish ships north along the Baja coast into California, landing in San Diego. There, he found abundant scallops, clams, lobster, and crayfish.

The Kumeyaay, descendants of the San Dieguito Paleo-Indians, then lived

along the bay. Fish and other sea life were readily available. The Kumeyaay made nets and traps out of agave fiber to catch smaller fish and mollusks (clams, mussels, and scallops). They made spears by tying cactus thorns to strong branches or gluing them on with gum from piñon pine trees. The Kumeyaay also wove tule reed boats. They paddled these boats beyond the breakers. They caught fish using sharp hooks made from abalone shells and lines made from yucca twine.

After Cabrillo landed, the population of California slowly began to grow. The Spanish padres were the first Europeans to settle the land. They built the first California mission near San Diego in 1769.

In the mid- and late-1800s, many people emigrated from Europe to California. Many Italians moved to the San Francisco area. Italy had a strong fishing industry. The San Francisco area had plenty of fish. The climate was similar to that of the old country. The Italian immigrants formed close-knit fishing communities in their new home. The fishing industry grew.

After the San Francisco earthquake in 1906, many fishing families sailed south to San Diego. These Italian fishermen became leaders in the sardine fishing industry in southern California. They spread gill nets on the kelp beds off Point Loma. These nets had small holes that caught sardines. The fishermen had to handpick the sardines out of the net one by one. Because this took so much time, they considered a few hundred pounds a big catch.

In 1908, families began to buy small gasoline engines for their fishing boats. The engines made it easier to travel to deeper waters. Fisherman



Tule reed boat

no longer had to depend on weather and tides. With this new technology, fishermen could now catch faster-swimming fish, like blue fin and albacore tuna. These fish swam over 40 miles an hour and could travel up to 150 miles a day.

Fishing crews started using a new net called the lampara. With this net, crews could scoop out sardines without having to handpick them. The fishermen could catch many more sardines. In fact, they caught more fish than the local people would eat. To preserve the huge catches, Alex Steele and Edward Hume started the first sardine cannery in San Diego. Canning made it possible to ship sardines across the country. The market for the fish grew.

Crews harvested so many fish that sardines had almost disappeared from southern California waters by

1910. The sardine industry declined. Canneries began to experiment with other types of fish. In 1911, the Pacific Tuna Company began to can albacore in San Diego. The company sold the fish by advertising that it had a mild flavor similar to chicken. People across the country started to buy tuna, and the tuna industry expanded.

By the 1920s, San Diego fisheries were harvesting over 97,000 tons of tuna per year. The city was known as the Tuna Capitol of the World. After sailing out to sea, fishing crews would drop live bait over the sides of their boats. The tuna went for the bait. Fishing crews then hooked the tuna on lines and brought them close to the boat. Then they pulled the fish over the side. An average tuna boat could bring in 100 to 200 tons of fish at a time.



After World War II, large corporations began to buy up the canneries in San Diego. These large companies helped small boat owners buy bigger boats. The new boats could travel 3,000 miles without refueling. They used massive nylon nets called purse seine nets. These nets were over a mile long.

A purse seine is a wall of net that fishermen use to surround a school of tuna. When the net is full, the boat crew closes the bottom like a draw-string purse. This herds the fish into the center of the net. Then the workers use smaller nets to scoop the tuna into the boat. The tuna is refrigerated or frozen soon after it hits the deck.

The fishing industry worked to keep up with the huge demand for tuna. More and more boats used purse seines. Supplies of fish near shore decreased, forcing San Diego fishermen to fish further out in the Eastern Pacific Ocean. The Eastern Pacific Ocean stretches from San Diego to the Hawaiian Islands. It reaches south along the coast of South America. On their long journeys out to sea, tuna boat crews easily spotted schools of dolphins as the mammals came to the surface to breathe. The crews discovered that tuna were likely to be swimming below the dolphins. The Eastern Pacific Ocean is the only place in the world where the two species swim together.

From the 1950s to the early 1970s, fishing crews used a practice called dolphin-set fishing. They flew over the ocean in helicopters, looking for dolphins. The fishermen knew there likely would be tuna beneath them. The crews set purse seines around the dolphins. Then they pulled the net's bottom together, capturing the tuna. However, they often caught dolphins as well. The trapped dolphins could not surface to breathe. Between 1950 and 1970, six million dolphins died in this way.



Tuna fisherman

To protect dolphins, Congress passed the Marine Mammal Protection Act in 1972. The fishing industry had to change its methods. Fishermen began using a new net called the Medina Panel. The holes in this net were too small to entangle dolphins. They also began using a technique called “backing down.” After they set the net, the crew pulled it out from under the dolphins, allowing the mammals to go free. These new practices prevented the deaths of many dolphins.

Despite these changes, the tuna industry in San Diego suffered in the 1980s. An El Niño current in 1982 and 1983 warmed the waters of the Eastern Pacific Ocean. Tuna moved to cooler, deeper waters further west. In this region, tuna and dolphins do not swim together. It was harder for the fishermen to find tuna.

Many canneries moved overseas where costs were lower. It was less expensive to buy and process tuna in foreign countries and export it to the United States than to buy U.S. tuna.

As fish populations decreased, South and Central American countries enforced their laws more carefully. U.S. boats had to buy expensive permits to fish within 200



Tuna fishing with purse seine net

miles of other countries’ coasts. Many U.S. boats broke the law because they could not afford the permits. Foreign governments seized many of these illegal tuna boats.

Finally, foreign tuna boats continued to fish with purse seines in the Eastern Pacific. Dolphin deaths rose again. This upset many people in the United States. They stopped buying tuna. In 1990, Star-Kist, Bumble Bee, and Chicken of the Sea—the major American tuna canners—agreed to use only “dolphin-safe” tuna. They put a dolphin-safe label on every

tuna can to let the public know about their commitment. No tuna caught using purse seines could earn the dolphin-safe label. Therefore, U.S. fisheries could no longer compete in the Eastern Pacific.

Over the years, the tuna industry in San Diego has suffered many losses. Even so, tuna boats still fish off the coast of California, as they have for thousands of years. With continued attention and smart management, fishing can provide an important resource for many years to come.



Common dolphins

